

Amendment dated: July 1, 2005

Application Serial No.: 10/769,902

Attorney Docket No. 032028-0311140 (23439-099-401)

In Response to Office Action mailed January 3, 2005

This listing of claims will replace all prior versions and listings of claims in the Application.

**LISTING OF CLAIMS:**

Claims 1-20. *Cancelled*

21. (*Currently Amended*) A system for measuring an opacity value for an exhaust emission plume, the system comprising:

a source of electromagnetic radiation that emits electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region, and that is directed through an exhaust emission plume, wherein the first wavelength region is substantially in the infrared region, the second wavelength region is substantially in the visible region, and the third wavelength region is substantially in the ultra-violet region;

a detector that detects the electromagnetic radiation ~~and outputs a detector signal proportional to the detected electromagnetic radiation~~ in each of the first, second, and third wavelength regions and outputs a signal proportional to a detected intensity at each of the first, second, and third wavelength regions; and

a processor that receives ~~the detector signal~~ signals from the detector and determines an opacity value proportional to the change in intensity for the detected intensity of each of the first, second and third wavelength regions ~~calculates an opacity value for the exhaust plume based, at least in part, upon the detector signal.~~

Claims 22-25. *Canceled*

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26. **(Currently Amended)** A method for calculating an opacity value for an exhaust emission plume, the method comprising:

obtaining an measurement of an exhaust constituent amount ( $n$ ) in a spatial volume of an exhaust emission plume;

directing a beam of substantially monochromatic electromagnetic radiation substantially through the spatial volume of an exhaust emission plume, wherein the beam of substantially monochromatic electromagnetic radiation comprises a beam of substantially ultra-violet radiation;

measuring a transmittance ( $T$ ) of the beam of substantially monochromatic electromagnetic radiation;

calculating an opacity value ( $K_s$ ) proportional to the relation

$$K_s = \frac{\ln\left(\frac{1}{T}\right)}{n}.$$

27. **(Previously Presented)** The method of claim 26, wherein the measurement of an exhaust constituent amount comprises a measurement of an amount of carbon dioxide ( $n_{CO2}$ ).

28. **(canceled)**

29. **(Currently Amended)** A system for determining an opacity value for an exhaust emission plume, the system comprising:

an exhaust constituent amount measuring system that measures an exhaust constituent amount ( $n$ ) in a spatial volume of an exhaust emission plume;

a source of substantially monochromatic radiation capable of forming a beam of radiation, wherein the source of substantially monochromatic radiation produces ultra-violet radiation;

a transmittance measuring system that measures a transmittance ( $T$ ) of the beam of radiation; and

a processor further comprising an opacity calculation module that calculates an opacity value ( $K_s$ ) according to the relation

$$K_s = \frac{\ln\left(\frac{1}{T}\right)}{n}.$$

30. **(Canceled)**

31. **(Previously Presented)** The system of claim 29, wherein the exhaust constituent amount measuring system measures an amount of carbon dioxide ( $n_{CO2}$ ).

32. **(Previously Presented)** The system of claim 29, wherein the exhaust constituent amount measuring system measures an amount proportional to the sum carbon monoxide and carbon dioxide ( $n_{CO} + n_{CO2}$ )